# Use of calculators in examinations 2016 – version 1.0



## **Calculator List**

This document should be read in conjunction with the calculator section of "The conduct of IB Diploma Programme examinations" document and other information available on the Online Curriculum Centre. It provides examples of calculators which are recommended for use in IB examinations and those which are prohibited. This list will be updated as and when necessary. It should be noted that these are not definitive lists and teachers should check other models against the information in "The conduct of IB Diploma Programme examinations" document. Schools should also ensure that all calculators used in examinations comply with the regulations.

#### **Recommended calculators**

The following models meet the minimum requirements for mathematics subjects and have updated and time-saving functionalities not found on other models.

Texas Instruments	TI 84 Plus – all models	TI 83 Plus
	TI Nspire (non-CAS), with 84 faceplate	TI 83 Plus silver edition
	TI Nspire (non-CAS) versions 1.3 or higher updated to the latest operating system	
	in "Press to Test" mode, with the correct features blocked (see list below)	
	TI Nspire CX (non-CAS) updated to the latest operating system in "Press to Test"	
	mode, with the correct features blocked (see list below)	
Hewlett Packard	HP Prime updated to the latest firmware in "Exam Mode", with the correct	
	features blocked (see list below)	
Casio	FX 9750G Plus or GII	FX 1.0 Plus
	CFX 9850 Plus	Graph 35 Plus
	CFX 9950 Plus	Graph 65 Plus
	FX 9860G /FX 9860G SD /FX 9860G AU	Graph 85 series
	FX 9860GII / FX 9860GII SD / FX 9860G AU PLUS updated to the latest	
	operating system for IB examinations in "Examination Mode"**	
	Graph 75 / Graph 95 updated to the latest operating system for IB examinations	
	in "Examination Mode"**	
	CG series - FXCG10/20 updated to the latest operating system for IB	
	examinations in "Examination Mode"**	

#### **Prohibited calculators**

The following models are not allowed in examinations under any circumstances.

Texas Instruments	TI Voyage 200 (all versions)	TI 89 (all versions)
	TI 92 (all versions)	TI Nspire CAS (all versions)
	TI Nspire (non-CAS) version 1.1 or version 1.2 or any other version <b>not</b> updated	
	to the latest operating system	
Hewlett Packard	HP 38-95 (all versions)	
Casio	Classpad 300	Graph 100
	FX 2.0 (all versions)	FX 9970 (all versions)
	FX 9860GII / FX 9860GII SD / FX 9860G AU PLUS <b>not</b> updated to the latest operating system**	
	Graph 75 / Graph 95 <b>not</b> updated to the latest operating system**	
	CG series - FXCG10/20 not updated to the latest operating system**	

\*\* See "Necessary actions with recommended calculators" below for new requirements.



#### Notes:

- Any devices with unrestricted/candidate accessible WiFi functionality are not permitted.
- Other calculators which have features that do not appear on any of the recommended models are not allowed.
- Candidates may not use or store data/notes, programs or flash (ROM) applications (Apps) in their calculators that may assist them in an examination by removing the need to recall facts or formulae.

### Extract from "The conduct of IB Diploma Programme examinations" document

Calculators of the types indicated as suitable are allowed only in the subjects listed in the table below.

Subjects	Calculators	
Business management	A four-function calculator, scientific calculator or GDC is required for all examinations.	
Environmental systems and societies		
Economics HL Paper 3	While all questions requiring a calculator can be answered fully using a four function (plus, minus, multiply, divide) calculator, graphic display calculators (GDCs) are allowed during the examination. The graphing functions on these calculators may assist students and it is therefore recommended that all students are familiar with the use of GDCs.	
Biology	Calculators are not allowed on paper 1.	
Chemistry	On paper 2 and paper 3, a calculator with the following minimum functionalities is	
Design technology	required (a GDC is recommended):	
Physics	decimal logarithms	
Sports, exercise	• values of $x^{y}$ and $x^{1/y}$	
and health science	<ul> <li>value of π (pi)</li> </ul>	
	trigonometric functions	
	inverse trigonometric functions	
	natural logarithms	
	• values of e <sup>x</sup>	
	scientific notation	



Subjects	Calculators	
Mathematical	A GDC with the following minimum functionalities is required on all papers:	
studies SL	draw graphs with any viewing window	
Further mathematics HL	solve equations numerically	
	• find a numerical derivative at a point	
	find a numerical definite integral	
	financial package	
	• add and multiply and find inverse matrices (further mathematics HL only)	
	find statistical values including:	
	- normal distribution	
	- binomial distribution	
	- Poisson distribution	
	- t-distribution	
	- binomial coefficient $\binom{n}{r}$ , nPr	
	- 1 and 2 var stats	
	- chi squared values (including <i>p</i> values)	
	Examiners will set questions assuming that all candidates have a GDC with the minimum functionalities listed here. Candidates using only four-function or scientific calculators, or using a less able GDC, will be at a disadvantage.	
Mathematics SL	Calculators are not allowed for paper 1.	
Mathematics HL	A GDC with the following minimum functionalities is required on all other papers:	
	draw graphs with any viewing window	
	solve equations numerically	
	find a numerical derivative at a point	
	find a numerical definite integral	
	financial package	
	find statistical values including:	
	- normal distribution	
	- binomial distribution	
	- Poisson distribution	
	- t-distribution	
	- binomial coefficient $\binom{n}{r}$ , nPr	
	- 1 and 2 var stats	
	- chi squared values (including <i>p</i> values)	
	Examiners will set questions assuming that all candidates have a GDC with the minimum functionalities listed here. Candidates using only four-function or scientific calculators, or using a less able GDC, will be at a disadvantage.	



# Necessary actions with recommended calculators

## TI Nspire / TI Nspire CX "Press to Test" configurations

**Note:** Candidates must upgrade their Nspire to the latest operating system to use the "Press to Test" properly. Nspires which have not been updated and put into the correct "Press to Test" mode are not allowed in the examinations. Nspires must be put into "Press to Test" mode immediately before the examination. If done earlier, a candidate must not have access to the calculator between the time it is put into "Press to Test" mode and the examination. Further details about "Press to Test" can be found on the TI website. Older versions may need two upgrades to enable the correct "Press to Test" mode.

The following options in "Press to Test" mode must be ticked and therefore blocked.

- Limit geometry functions
- Disable function and conic grab and move, and disable change of equation form
- Disable vector functions, including eigenvectors and eigenvalues
- Disable "isPrime" function
- Disable differential equation functionality
- Disable 3D graphing
- Disable implicit graphing, conic templates, conic analysis, and geometric conics

The following options in "Press to Test" mode must be unticked and therefore allowed.

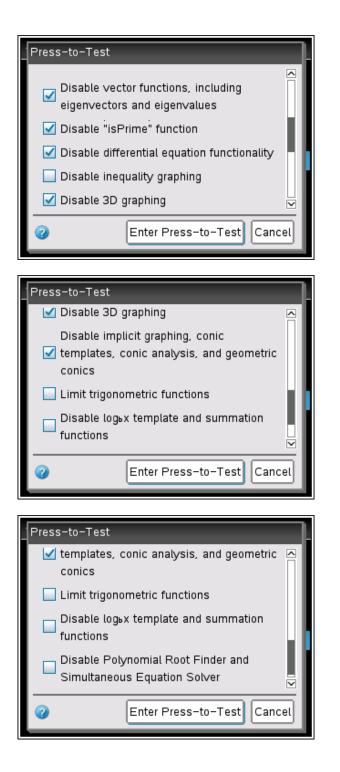
- Disable inequality graphing
- Limit trigonometric functions
- Disable log<sub>b</sub>x template and summation functions
- Disable Polynomial Root Finder and Simultaneous Equation Solver

The following screen shots show how to put the Nspire into the correct "Press to Test" mode.

Press-to-Test		
Prevent access to pre-existing content Angle Setting: Degree Restrictions (Ctrl + A to check/uncheck all) Limit geometry functions		
Disable function and conic grab and move, and disable change of equation		
2 Enter Press-to-Test Cancel		
David to Task		
Press-to-Test Angle Setting: Degree Restrictions (Ctrl + A to check/uncheck all)  ✓ Limit geometry functions Disable function and conic grab and ✓ move, and disable change of equation form ✓		



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**Note:** When put in "Press to Test", the angle setting can be set to "Degree" or "Radian" depending on candidate preference.



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# TI 83 / TI 84 recommended calculators

- 1. Reset all RAM memory.
- 2. Reset Archive Vars (if applicable).
- 3. Remove all Flash (ROM) applications (Apps) except those listed below, where applicable.

App Menu Name	Description
CBL/CBR	Connectivity/set-up of CBL <sup>™</sup> data collection system (Other connectivity Apps for USB-type probes are also acceptable and do not need to be removed.)
Chinese	Chinese version of Catalog Help
CtlgHelp	Catalog Help provides easy access to calculator function information
Dansk	Danish language localizer—this App will translate all prompts, error messages and most functions into Danish
Deutsch	Language localizer—this App will translate all prompts, error messages and most functions into German
EasyData	Connectivity App for USB-type data collection probes
Español	Language localizer—this App will translate all prompts, error messages and most functions into Spanish
Finance	Finance operations—part of the Operating System
Français	Language localizer—this App will translate all prompts, error messages and most functions into French
Italiano	Language localizer—this App will translate all prompts, error messages and most functions into Italian
Magyar	Language localizer—this App will translate all prompts, error messages and most functions into Hungarian
Nederlan	Language localizer—this App will translate all prompts, error messages and most functions into Dutch
Norsk	Language localizer—this App will translate all prompts, error messages and most functions into Norwegian
Polski	Language localizer—this App will translate all prompts, error messages and most functions into Polish
PolySmlt	Combination of two programs, one that finds polynomial roots and one that finds solutions to systems of equations. This version is an older version than PolySmlt2.
PlySmlt2	Combination of two programs, one that finds polynomial roots and one that finds solutions to systems of equations
Portug	Language localizer—this App will translate all prompts, error messages and most functions into Portuguese
Suomi	Language localizer—this App will translate all prompts, error messages and most functions into Finnish
Svenska	Language localizer—this App will translate all prompts, error messages and most functions into Swedish



## HP Prime "Exam Mode" configurations

**Note:** Candidates must upgrade their Prime to the latest firmware to use the "Exam Mode" properly. Primes which have not been updated and put into the correct "Exam Mode" are not allowed in the examinations. Primes must be put into "Exam Mode" immediately before the examination. If done earlier, a candidate must not have access to the calculator between the time it is put into "Exam Mode" and the examination. Further details about "Exam Mode" can be found on the HP website.

The following options in "Exam Mode" mode must be ticked.

- Erase memory:
- Blink LED:

The following options in "Exam Mode" mode must be ticked and therefore blocked.

- PredX
- PredY
- Linear Solver
- Triangle Solver
- Linear Explorer
- Quadratic Explorer
- Trig Explorer
- Geometry
- Advanced Graphing
- User Apps
- Physics
- CAS
- Notes and Programs
- New Notes and Programs
- Vector
  - CROSS
  - DOT

The following screen shots show how to put the Prime into the correct "Exam Mode".

E	ixam Mode	13:42
Configuration:	No CAS	٧
Timeout:	1 Hour	. 4
Default Angle:	No change	۲
Password:		
Erase memory:	$\checkmark$	
Blink LED:	√	

Notes:

- "Timeout" must be set for at least the duration of the examination.
- When put in "Exam Mode", the default angle setting can be set to "Degrees" or "Radians" depending on candidate preference.



E Stephen : IB*	E Stephen : IB*	
Timeout: 8 Hours 🔻	Timeout: 8 Hours	
Password:	Password:	
Erase memory: 🔽	Erase memory: 🔽	
Blink LED:	Blink LED:	
Default Angle: Degrees	Default Angle: Degrees	
System Apps	Inference     Parametric	
Function	<ul> <li>Parametric</li> <li>Polar</li> </ul>	
Solve     Statistics 1Var	Sequence	
Statistics 1 Var	Finance	
PredX	Vinear Solver	
PredY	<ul> <li>Image Solver</li> <li>Triangle Solver</li> </ul>	
Resid	V Linear Explorer	
Do2VStats	Quadratic Explorer	
SetDepend	Trig Explorer	
SetIndep	DataStreamer	
CHECK, UNCHECK, ISCHECK	Geometry	
Inference	Spreadsheet	
Parametric	Advanced Graphing	
Polar	User Apps	
▷ Sequence =	Physics     Help	
Finance     Inter Solver	Units	
V V Linear Solver      V V Iriangle Solver	Matrices	
V Linear Explorer	Complex	
Quadratic Explorer	CAS	
Trig Explorer	▷ □ USB	
DataStreamer	Notes and Programs	
Geometry	New Notes and Programs	
Spreadsheet	▲ Mathematics	
Advanced Graphing	Numbers	
V User Apps	Arithmetic	
Physics	Trigonometry	
Help	Hyperbolic	
Units	Probability     List	
Matrices     Complex	A Matrix	
CAS	DET	
▶ □ USB	RREF	
Notes and Programs	TRN	
New Notes and Programs	Create	
Mathematics	Basic	
Numbers	✓ Vector	
Arithmetic	CROSS	
Trigonometry +	▼ DOT	
Start Stop	Start Stop	



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### Casio FX 9860GII / FX 9860GII SD / FX 9860G AU PLUS / Graph 75 / Graph 95 / FX CG10 / FX CG20 – Operating system download and "Examination Mode" instructions

Follow this link (<u>http://edu.casio.com/ib/index.html</u>) to the Casio website and follow the instructions to install the required operating system for the IB examinations. This link is also to the user manual for the "Examination Mode" functionality which must be engaged immediately before the examination and continue for the duration of the examination.

Note that updating the operating system for the models named "USB POWER GRAPHIC/GRAPHIQUE USB" is sufficient, there is no need to put these into examination mode. However, all memory must be initialized/reset on these models.

### All other recommended Casio calculators

Initialize/reset all memory.



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